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from the hyphal wall. The opening is finally completely closed, and at the center an excess of material is deposited, giving rise to a papilla-like structure described as a "canal" by LÉGER. During this process the wall between the two gametangia is resorbed. The line of contact between the two protoplasmic bodies remains distinct for some time, owing to the presence between them of the granular material mentioned above, but finally the masses fuse. Multiple nuclear fusions appear to occur at this stage. The nuclei which fail to fuse are smaller than the fusion nuclei, and soon disintegrate. No evidence of a uninucleate stage was observed. At this time numerous oil bodies, which are regarded as being of the same nature as the elaioplasts of higher plants, appear in the protoplasm. These bodies fuse until two or three large ones are formed. The large elaioplast-like bodies the author believes to be the "sphère embryonnaires" of LÉGER.—H. HASSELBRING.

Proceedings of the National Academy.—This new monthly publication began to appear with the January issue of 1915. In addition to the reports and announcements that belong to it naturally, as the official organ of publication of the National Academy, it will also serve as a medium for the prompt publication of brief original papers by members of the Academy and other American investigators. The papers will be much shorter and less detailed than those published in the special journals, and the aim of the *Proceedings* is to secure promptness of publication and wide circulation of the results of American research among foreign investigators. The editorial board includes a representative from each one of the special fields of science, the editor of the BOTANICAL GAZETTE being the botanical representative on the editorial board of the *Proceedings*.

The first two numbers contain the following botanical papers: *Phoradendron*, by WILLIAM TRELEASE (Proc. Nat. Acad. 1:30-35. 1915); The morphology and relationships of *Podomitrium malaccense*, by DOUGLAS H. CAMPBELL (*ibid.*, 36, 37); and A phylogenetic study of cycads, by CHARLES J. CHAMBERLAIN (*ibid.* 86-90). In addition to these papers that are credited to the section of botany, certain papers in genetics, physiology, and chemistry come well within the scope of present botanical interest. For example, the paper by E. M. EAST, entitled An interpretation of self-sterility (*ibid.* 95-100), deals with an interesting problem of genetics among plants.—J. M. C.

Evolution of the flower.—HORNE²⁷ has contributed a very detailed study of the structures of the flower which he regards as indicators of phylogeny. The families specially studied are the Hamamelidaceae, Caprifoliaceae, and Cornaceae, but the principles involved have general application. He includes in his discussion also the possible applications of the various theories of evolu-

²⁷ HORNE, A. S., A contribution to the study of the evolution of the flower, with special reference to the Hamamelidaceae, Caprifoliaceae, and Cornaceae. Trans. Linn. Soc. London II Bot. 8:239-309. pls. 28-30. figs. 13. 1914. .

tion, and especially the light shed upon his problem by the work in plant genetics. Much stress is laid upon the varying characters of the ovule and its connections, beginning with the orthotropous ovule, as relatively primitive, and advancing through "anatropal advance and specialization," which latter, by the way, is said to be accompanied by the transition from two integuments to one. It is interesting to note that in the author's judgment "no phylogenetic significance can be attached to a particular form of vascular system." Applying his criteria, HORNE concludes that both Caprifoliaceae and Cornaceae are polyphyletic, and warns the authors of "systems" that "knowledge of the phylogeny of angiosperms can only be truly advanced by the detailed morphological and experimental investigation of many more families, and then, but not till then, can ENGLER's system be replaced by a greater scheme, more nearly approximating to natural relationships."—J. M. C.

Fossil plants from Kentucky.—Six genera of fossil plants from Kentucky are the subject of an intensive study by SCOTT and JEFFREY.²⁸ The exact level from which these plants come is somewhat in doubt, but the evidence favors the base of the Carboniferous, although the uppermost Devonian is not excluded. The fossils belong to three groups. The first of these includes the stem of one of the Cycadofilicales known as *Calamostachys* with its petiole (*Kalymma*), another petiole of the related genus *Calamopteris*, and a petiole referred to the genus *Periastron*. All of these genera have previously been known only from the Culm of Germany, where they were found and named by UNGER, and it is of much interest to note that the same flora existed on this continent, although as far as is known the species were distinct. The second group comprises two new genera: *Stereopteris*, which is apparently the petiole of a fern, and *Archaeopitys*, which presents a new and interesting type of cordaitan stem. In a third group may be placed a cone of the usual *Lepidostrobus* type. The structure is fairly well preserved in most of these fossils, and is illustrated in the 13 quarto plates which accompany the paper.—M. A. CHRYSLER.

Phylogeny of angiosperms.—In continuing their studies of this subject, SINNOTT and BAILEY²⁹ have investigated the evidence to be obtained from leaves. They conclude, from paleobotanical evidence, from the correlation between the palmate leaf and the multilacunar node, and from the frequency of this type of leaf in the relatively primitive groups, that the leaf of the primitive angiosperm was palmate in type and probably lobed. They

²⁸ SCOTT, D. H., and JEFFREY, E. C., On fossil plants showing structure, from the base of the Waverley Shale of Kentucky. Trans. Roy. Soc. London 205:315-373. pls. 27-39. 1914.

²⁹ SINNOTT, E. W., and BAILEY, I. W., Investigations on the phylogeny of the angiosperms. 5. Foliar evidence as to the ancestry and early climatic environment of the angiosperms. Amer. Jour. Bot. 2:1-22. pls. 1-4. 1915.